REMARKS

An objection is made with respect to claim 12. This claim has been amended in a manner that is respectfully believed to fully obviate this claim objection by having same depend on claim 1, rather than claim 6, which had been cancelled. Reconsideration and withdrawal thereof are respectfully requested.

Claim Revisions:

Each of independent method claim 1 and composition claim 13 are amended to specify that the calcium sulfate dihydrate DSG particles are **uncalcined synthetic gypsum particles**, support therefor being found, for example, in paragraphs [0003], [0013], [0015], [0017], [0024], [0031], [0032], [0036], [0040], [0042], [0043], [0046]-[0050] and [0053]-[0057], and in original claims 10 and 11.

Claims 1 and 13 also are amended to specify that the uncalcined synthetic calcium sulfate dihydrate DSG particles are present within the range of about **10% to 30% w:w** of the stucco or calcium sulfate hemihydrate, which improves acoustic properties of the wallboard. Support for same is found, for example, in original claim 16. Also, claims 7 and 16 now specify this percentage is about 10% to 25%, claims 23 (new) and

17 specify this percentage as about 10% to 20%, and claims 9 and 18 specify about 20%.

Claim 1 is revised to state the sheets prepared are formed as gypsum wallboard by setting of the slurry **in the absence of compression.** Claim 13 is revised to state the cementitious composition had been set in the absence of compression. Support and meaning can be appreciated from paragraph [0038] and its statement "slurry sandwiched between two sheets of paper," as well as paragraph [0039] which states, "guides maintain the board thickness … as the setting slurry travels on the moving conveyor belt." In addition, paragraph [0035] states that the plasterboard manufacture process is well known in the art. Thus, step (c) of claim 1 clarifies that the gypsum wallboard is made by the conventional process of setting the slurry, rather than by a process (of prior art such as Deleuil) wherein the gypsum material is molded through compression. As noted previously, compression is unnecessary and undesirable for wallboard manufacture. Wallboard manufacture is the subject of the present claims. It is respectfully intended that this revision of claim 1 will help to distinguish between wallboard manufacture by setting of the slurry by normal procedures, which

are in the absence of compression(as claimed) and compression molding (which is the province of Deleuil).

As a further indication of normal processes of manufacturing plasterboard, applicants today filed a Supplemental Information Disclosure Statement submitting a brochure of Grenzebach entitled "Gypsum Technology," or "Baustoffprospek.pdf." As evident from this brochure, the general technique of plasterboard manufacturing involves preparing a layer of paper sheet, spreading gypsum composition on the paper and layering a further sheet of paper over the gypsum, thereby forming a sandwich arrangement. This brochure provides a good illustration of the stages of a typical production line, including a step of allowing the slurry to set, as specified in claims 1 and 13. Applicants direct the Office's attention to the overview diagram on page 8 and the fact that same **does not include a compression stage**, there being no positive description of compression in the brochure, which is consistent with the wording "in the absence of compression" of claims 1 and 13 as presently amended. Instead, the sandwich arrangement of combined layers moves through an "extruder" plate or zone in order to consolidate and bind the material into a plasterboard product. The extruder plate does not provide

compression; it merely acts to coalesce the layers together, allowing the board shape to be formed and maintained at the correct thickness. Applicants respectfully observe that this action is similar to that of a letter passing through the slot of a letterbox.

Concerning the **undesirability of compression**, a final plasterboard product comprises at least 50% air in comparison to the density of gypsum. This means that compression should be avoided in manufacture in order to preserve the percentage of air within the gypsum layer. In this regard, the Supplemental Information Disclosure Statement filed today contains a Gyproc Wallboard product data sheet, which indicates that the weight of a 12.5 mm thick plasterboard is 8.0 kg/m^2 (see the box on the first page), which is equivalent to a density of 0.64 g/cm^3. In this regard, the inventors observe that the density of gypsum is 2.32 g/cm^3 (Reference: CRC Handbook of Chemistry and Physics, 77^{th} Edition, 1996-97, ISBN 0-8493-0477-6, Pg. 422.) This reduction in density of the board (from solid gypsum) is achieved through the introduction of large quantities of air during this normal plasterboard manufacture. Clearly this means the board cannot be compressed; otherwise, this air would be eliminated, causing a dense product to be formed, which is

highly undesirable as it would defeat the purpose of air introduction during manufacturing in order to reduce the weight of the wallboard. It will be appreciated that, if a compression step were added such as taught by Deleuil, the result would be an undesirably dense product that would not be wallboard as specified in the present claims. Thus, the present claims exclude molded products such as ceiling tiles made in accordance with Deleuil.

The §102(b) and §103 Rejections:

Claims 1-5, 7, 9, 13, 16, 21 and 22 are rejected under 35 U.S.C. §102(b) from Deleuil U.S. Patent No. 4,221,599. Claims 17 and 18 are rejected under 35 U.S.C. §103(a) from Deleuil. Claims 12 and 19 are rejected under 35 U.S.C. §103(a) from Deleuil in view of Marcoux et al. U.S. Patent No. 5,980,627.

Prior Art Sound Absorption Is Not Same as Improving Wallboard Acoustic Properties:

Concerning Deleuil and possible teachings regarding acoustic properties, Baig U.S. Published Patent Application No. 2002/0139611 is in the compr5ession molding art for making products in mold cavities as does Deleuil.

One of ordinary skill in the art looking for improving acoustic properties of wallboard would not look to compression

molding art such as that relied upon in the present Office Action. Furthermore, the differences between the approach of compression molding art, which improves acoustics by absorbing sound due to their fibrous nature versus plasterboard or wallboard, which provides "blocking" of sound waves, are substantial and further evidence the inappropriateness of relying on teachings of Deleuil in attempting to negate the important technical advance and unexpected results according to applicants' claimed invention. Furthermore, on page 5 of the Office Action, it is alleged that the Deleuil particles are an inert particulate filler that "inherently improve acoustical properties of the final product." At this passage, the Office refers to claim 1 of Deleuil, which has no disclosure, teaching or suggestion regarding acoustical properties improvement. Instead, reference is made to a finely divided powdery plaster, a finely divided powdery water donor, and a finely divided waterproofing agent. This passage in the Office Action also suggests comparing claim 1 of Deleuil with paragraph [0050] of applicants' disclosure. Applicants do not understand the connection and request further clarification. More importantly, any comparison of prior art with applicants should compare the

prior art to the wording of applicants' claims, not of a paragraph selected by the Office.

Baig paragraph [0030] mentions sound absorption and it is described as a characteristic measured with an impedance tube and recorded as an NRC value (see paragraph [0016] to [0017]). Applicants advise that NRC is a dimensionless figure and relates to sound absorption. It is also noted that the measurement technique used is suitable for test items of centimeter dimensions and not the typical plasterboard sheet of a size of 10 square meters.

In contrast, the presently claimed invention is for sound insulation to improve wallboard acoustic properties, which is measured in different ways and has units of dB. Thus, applicants' Example 2 describes "sound blocking" properties in the units of Weighted Airborne Sound Reduction index (Rw) in dB. The Rw (dB)value is a measurement of a different acoustic property than that measured with NRC as in Baig for ceiling tiles. The porous structure of the ceiling tiles of Baig will prove acoustics by absorbing sound due to their fibrous nature. The plasterboard as presently claimed in contrast provides "blocking" of sound waves, for example as might be desirable for partition walls of an office suite.

Deleuil and Other Compression Art Rejections:

With respect to the discussion of Deleuil on page 3 of the Office Action with respect to claim 1 and on page 4 of the Office Action with respect to claim 13, the observations made herein note that Deleuil is in the art of compression molding and requires applying a compaction pressure. For this reason, the teachings of Deleuil regarding the utilization of synthetic gypsum neither anticipate nor render obvious the invention as specified in presently amended claims 1 and 13.

As a further indication of novelty and unobviousness of the presently claimed invention from Deleuil (and prior art regarding molded ceiling tiles that are made with compression), applicants respectfully refer to a reference relied upon on page 8 of the Office Action, in paragraph 24, namely Baig. Baig does, as the Office appreciates, point to a method of preparing an acoustical ceiling tile using gypsum particles over a range and that the Office suggests teaches acoustical properties optimization. Baig is useful in discerning the manufacturing differences between the wallboard product of the present invention and the ceiling tile of Baig or, by logical extension, to Deleuil. Paragraphs [0014] to [0018] of Baig describe the process of manufacturing and machinery as from the paper-making

industry. The mat comprises a set of fibers onto which the fibrous product is laid. A vacuum is applied in order to dewater the product, and a fluffy fibrous matting is attained. The fibrous mat then is placed under, and processed and compressed through, a press roll, as specified in paragraph [0022] of Baig in order to produce the ceiling tile and maintain porous (sound-absorbing) qualities.

The present invention claims the manufacture of wallboard, or plasterboard. Applicants provide the following basic process description of plasterboard or wallboard manufacture.

Hemihydrate (CaSO4. 0.5H20) is mixed with water and a foaming agent (plus some minor additives). The mixture forms a wet slurry that is deposited onto a paper liner that sits on a continuous moving conveyor belt. As this belt moves forward it carries the paper forward with the deposited wet slurry. A second paper liner is laid onto the wet slurry to enclose the wet slurry mixture. The enclosed volume of wet slurry (encased in the two paper lines) is formed into the final article shape, a flat board, by passing through an extruder. This extruder has a fixed shape with the same dimensions as the cross-sectional area of the flat board that is formed. This extruder does not apply any pressure or force to the wet slurry; it is there

solely to shape the flat structure by moving the wet slurry. No pressure is applied because the board must maintain a low density. The board formed must have a volume of approximately 50% air in order to achieve a low density. This air is incorporated using the foaming agent. Any force or pressure applied to the board will expel this air for the board, thus compressing the board.

Applicants note the following key differences between applicants' presently claimed "absence of compression" approach and the Deleuil (or Baig) compression molding approach.

- Deleuil clearly teaches mold cavities and applying compaction pressure to make his pressure compacted products. Paragraph 19 of Baig mentions a press roller, which removes water. Someone experienced in the manufacture of boards would know that this press roller removes water through the application of pressure. If such a press roller were used in the manufacture of plasterboard then it would cause the collapse of the air incorporated into the plasterboard.
- For example, paragraph 19 of Baig mentions that the mat thickness starts from 1 inch to about 2.5

inches, and when compressed and dried is 0.25 to 0.625 inch.

- For wallboard the initial thickness of the board before the extruder is approximately 12.5 mm and after the extruder is 12.5 mm. Therefore there is no compression happening in the article.
- Wallboard as claimed has the water removed through a drying process only. Prior art such as Deleuil and Baig use a press and dryer.
- Paragraph 18 of Baig mentions that the process described is such as Fourdrinier or Olivier mat. It is well known to someone in the art that this describes a generic process that is used to make a fibrous mat type product (like paper or a fibrous ceiling tile). This is a completely different process to that of wallboard manufacture as claimed.

In summary, this comparison of Deleuil (or Baig) with the art of the present invention shows that the technology is substantially different.

Stucco Percentages:

On page 6, the Office discounts the significance of the stucco percentages in the claims, relying upon an assertion that same are near "optimum ranges by routine experimentation." The claimed range of 10% to 30% w:w of uncalcined synthetic gypsum particles present in the calcium sulfate hemihydrate specified in claims 1 and 13 are not explicitly disclosed in Deleuil, which the Office characterizes as a weight percent of 30-99 of stucco to gypsum. The Office makes an assertion of *prima facie* obviousness because one of ordinary skill in the art would want to optimize the teachings of Deleuil to improve properties such as acoustics. However, the compression approach of Deleuil and the differences in acoustics between molded materials and plasterboard or wallboard made by setting without compression as explained herein, is much more than a mere optimization of teachings. Instead, it is a different approach, namely using 10% to 30% uncalcined synthetic gypsum particles set during wallboard manufacture in the absence of compression. Surprisingly, this has resulted in gypsum wallboard with improved acoustic properties.

By the above observations, the teachings of Deleuil are even further afield when one considers the percentage ranges of

claims 7 and 16, of claims 23 and 17, and of claims 9 and 18. Accordingly, the unobviousness of these dependent claims is believed to be in order separate and apart from the unobviousness of independent claims 1 and 13.

Because Deleuil is in the art of compression molding requiring applying a compaction pressure, and because Deleuil has no teaching concerning improving acoustic properties of wallboard as claimed, there is no recognition, disclosure or teaching in Deleuil of the properties of applicants' invention and the relationship thereof to the amount of uncalcined synthetic gypsum calcium sulfate dihydrate DSG particles (e.g., 10% to 30%) present in a slurry that sets without compression into gypsum wallboard having improved acoustic properties.

Unobviousness of currently amended claims 1 and 13 and dependent claims 7, 16, 23, 17, 9 and 18 is supported by unexpected results and technical merit. applicants respectfully refer to their EXAMPLE 1 showing that 20 weight percent and 25 weight percent calcium sulfate dihydrate DSG particles realize a water savings advantage without detrimental effects on production of plasterboard, a decided advantage. EXAMPLE 2 reports that the inclusion of 20 weight percent calcium sulfate dihydrate DSG particles in the slurry for making wallboard by

setting is as good as or better than natural rock for sound reduction. EXAMPLE 3 reports that calcium sulfate dihydrate DSG particles at 10 weight percent and 20 weight percent w:w of calcium sulfate hemihydrate have no detrimental effect on setting times.

Accordingly, when applicants' claimed invention as in claims 1 and 13 is considered as a whole and as currently amended, Deleuil neither anticipates nor renders obvious claim 1 or claim 13.

Concerning the remaining claims that are presently rejected by Deleuil alone, namely claims 2-5, 21 and 22, each such claim is ultimately dependent upon either claim 1 or claim 13 as presently amended, and the novelty and unobviousness thereof are present due to such dependencies. Reconsideration and withdrawal of these §102(b) and §103 rejections are respectfully requested.

Deleuil Plus Marcoux Rejection and Other Art:

Marcoux is added to Deleuil for the §103 rejection of claims 12 and 19, the Office stating, without support, that this combination "implicitly improves the acoustic properties of the final product." Marcoux grinds waste gypsum boards and further processes same to obtain an absorbent or filler material.

Marcous teaches absorbency for oil, grease and chemicals on floors and in litter boxes. Acoustic properties improvement would not be reasonably expected. Reconsideration and withdrawal of this §103 rejection of claims 12 and 19 are accordingly respectfully requested.

In the Response to Arguments portion of the present Office Action, the Office refers to evidentiary reference Roth et al. U.S. Patent No. 5,362,471. The Office takes the position that applicants' claims do not preclude manufacture by compression. Independent claims 1 and 13 now specify the absence of compression contrary to Roth's teaching of making gypsum flakes in which the gypsum is compressed into a thin sheet. Thus, Roth teaches making gypsum flake under compaction. Roth does not teach making wallboard as applicants claim.

Applicants have made an earnest endeavor to place this application into condition for allowance, and favorable consideration is respectfully requested.

Respectfully submitted,

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